

Georgia on this date, causing damage to crops, outbuildings, etc. *Kentucky*.—Reports from Todd and Muhlenburg counties state that a destructive storm, moving northwest to southeast, passed through those counties, blowing down buildings, etc. *Montana*.—Fort Custer: a thunder-storm passed over this place between 5 and 6 p. m. Hail fell from 5.23 to 5.27 p. m., the average size of the hail-stones being one and one-half inches in diameter, although some were much larger. Horses

and cattle exposed to the storm were badly hurt by the hail. More than 1,000 window panes were broken.

28th. North Carolina.—A severe local storm, the most violent part of which lasted less than one minute, occurred about 2.30 p. m. at Laurinburg, Richmond Co.; some buildings were blown down and others unroofed. Powelton, Richmond Co.: during the afternoon several buildings were unroofed or otherwise damaged by a severe storm.

INLAND NAVIGATION.

STAGE OF WATER IN RIVERS AND HARBORS.

In the following table are shown the danger-points at the various stations, the highest and lowest depths for June, 1888, with the dates of occurrence and the monthly ranges:

Heights of rivers above low-water mark, June, 1888 (in feet and tenths).

Stations.	Danger-point on gauge.	Highest water.		Lowest water.		Monthly range.
		Date.	Height.	Date.	Height.	
<i>Red River:</i>						
Shreveport, La.	29.9	1	24.7	24 to 27	19.0	5.7
<i>Arkansas River:</i>						
Fort Smith, Ark.	22.0	11	16.3	8	4.5	11.8
Little Rock, Ark.	23.0	14	16.5	10, 11	6.2	10.3
<i>Missouri River:</i>						
Omaha, Nebr.	18.0	30	16.3	8, 11	11.5	4.8
Leavenworth, Kans.	20.0	30	17.9	10	14.4	3.5
<i>Mississippi River:</i>						
Saint Paul, Minn.	14.5	1	10.8	10, 29, 30	7.6	3.2
La Crosse, Wis.	24.0	1	13.0	13, 14	9.9	3.1
Dubuque, Iowa	16.0	2, 3	16.4	18, 19, 20	11.9	4.5
Davenport, Iowa	15.0	4, 5	12.9	21, 22	9.0	3.9
Keokuk, Iowa	14.0	1	15.2	30	9.1	6.1
Saint Louis, Mo.	32.0	3, 4	29.3	15	23.2	6.1
Cairo, Ill.	40.0	6	32.4	17	24.0	8.4
Memphis, Tenn.	34.0	8	27.0	19	20.4	6.6
Vicksburg, Miss.	41.0	12, 13, 14	34.9	30	28.8	6.1
New Orleans, La.	13.0	13, 14	12.2	30	10.3	1.9
<i>Ohio River:</i>						
Pittsburg, Pa.	22.0	30	7.0	15, 16	2.0	5.0
Cincinnati, Ohio	50.0	5	19.2	27	6.5	2.7
Louisville, Ky.	25.0	6	8.1	25	4.0	4.1
<i>Cumberland River:</i>						
Nashville, Tenn.	40.0	30	11.9	27	2.1	9.8
<i>Tennessee River:</i>						
Chattanooga, Tenn.	33.0	3	9.2	27	2.8	6.4
<i>Monongahela River:</i>						
Pittsburg, Pa.	29.0	30	7.0	15, 16	2.0	5.0
<i>Savannah River:</i>						
Augusta, Ga.	32.0	1	16.9	26, 27, 28	7.0	9.9
<i>Willamette River:</i>						
Portland, Oregon		18 to 22	18.2	1	11.8	6.4

The Signal Service observer at Nashville, Tenn., reports that the rains from the 25th to 28th caused the Cumberland River to rise sufficiently to permit the resumption of navigation, which had been almost entirely suspended on account of low water.

FLOODS.

Bar Mills, York Co., Me.: the Saco River at this place was at a very high stage on the 3d. A mill at Hollis was washed away during the evening of the 2d.

New Orleans, La.: nearly three inches of rain fell in one hour and forty minutes on the afternoon of the 6th, causing the inundation of several streets. Another heavy rainfall occurred on the 26th, when about 4.50 inches fell. Between 8 and 9 p. m. a large part of the city was submerged.

Vinita, Cherokee Nation, Ind. T.: a "cloud-burst" occurred near here during the morning of the 10th, flooding the country, and washing away several bridges.

Aitken, Aitken Co., Minn.: the heavy rainfall during the night of the 13-14th caused the inundation of a part of this place, compelling many families to leave their homes.

The "Toledo Blade" of the 12th contained the following, which also appeared in numerous other papers.

DULUTH, MINN., June 12.—The recent severe rains have caused the greatest flood ever known in northern Minnesota. Along the branches of streams tributary to the Saint Louis River millions of acres of land are overflowed and loss of life is feared. At the village of Cloquet, thirty miles from here, that portion of the town which is situated on the island is completely engulfed by a raging torrent. Only the tops of houses are visible. Several dwellings

have been carried away, but the inhabitants were warned in time, and no loss of life occurred. The immense saw mills are flooded and abandoned, and in the booms 80,000,000 logs were jammed yesterday morning, and the number reached 200,000,000 last night. All county bridges have been carried away. Fond du Lac, sixteen miles from here, is under water, and several buildings have been carried down stream. From Fond du Lac to beyond Spring Lake the tracks of the Saint Paul and Duluth Railway are under water from two to three feet, and the stream is still rising. Indians and old settlers say the flood has never been equalled.

Titusville, Crawford Co., Pa.: during the night of the 15-16th there was a very heavy fall of rain, which caused Oil Creek to rise seven feet in about an hour. Buildings were moved from their foundations and bridges were swept away. In the surrounding country great damage was done.

Collinsville, Madison Co., Ill.: the heavy rainfall during the night of the 15-16th damaged property in this vicinity to a considerable extent.

Carrollton, Carroll Co., Mo.: the very heavy rainfall during the night of the 15-16th caused Wakenda Creek to overflow about twenty square miles of the adjacent lowlands. Extensive washouts occurred on the railroads in this section. At Chillicothe, Livingston Co., the rainfall was remarkably heavy, and the lower floors of store rooms, etc., were flooded, causing much damage.

Saint Louis, Mo., 16th: from 12.45 a. m. to 11.48 a. m., 4.50 inches of rain fell, this being the heaviest fall recorded here since the establishment of the signal station in November 1870. In several places there were washouts around the sewer vents. That portion of the city in the vicinity of Cass avenue and Twenty-second street was overflowed in the morning, the sewers being inadequate to carry off the rainfall, but no particular damage was done. Reports from Norborne, Carroll Co., Mo., state that much stock was drowned in that vicinity.

Fort Buford, Dak.: the river overflowed in some places in this vicinity on the 23d.

Fort Stanton, N. Mex.: a very heavy rainfall occurred a few miles west of this place on the 18th. A small stream running through Fort Stanton rose to an unusual height in a very short time. Many bridges and fences were washed away and farms and gardens were damaged.

Mobile, Ala.: light rain began at 11.20 p. m. 25th and continued throughout the 26th, falling very heavy at intervals; the total fall for the twenty-four hours ending at 10 p. m. was 4.63 inches. On the morning of the 27th there was another very heavy fall of rain, amounting to more than six inches.

Leavenworth, Kans.: from 12.08 until 4.20 p. m. 26th 2.50 inches of rain fell. The sewers and culverts were unable to carry off the water and nearly all the cellars in the business portions of the city were flooded. Three-Mile creek, which passes through the city, overflowed and did considerable damage to the Fifth street bridge. All railroads leading into the city suffered from washouts, and trains were delayed in consequence.

Tuscola, Douglass Co., Ill.: the very heavy rainfall during the night of the 26-27th flooded the southern part of this town to such an extent as to compel about fifteen families to abandon their dwellings. It is estimated that about 10,000 acres of corn in this county were submerged.

HIGH TIDES.

Galveston, Tex., 17th. Calais, Me., 27th.

ATMOSPHERIC ELECTRICITY.

AUORAS.

Auroras occurred on but few dates in June, and all of the displays observed were either faint or of moderate brilliancy. The aurora of the 3d was the most extensively observed display of the month. It was reported from eastern Montana to New England coast and southward to the fortieth parallel. Although the night was generally clear and favorable for observing this display, it was only reported from widely distant stations.

Auroras were observed during the month as follows: 1st, Saint Paul, Minn.; Quakertown, Pa. 2d, Webster, Dak.; Traverse City, Mich.; Clayton, N. J.; Delavan, Wis. 3d, Bismarck, Dak.; Independence, Iowa; Bar Harbor, Orono, and Portland, Me.; Blue Hill Observatory, Cambridge, and Provincetown, Mass.; Moorhead, Minn.; Poplar River, Mont.; Manchester, N. H.; Beverly and Clayton, N. J.; Rose and Setauket, N. Y.; Reading and State College, Pa.; Madison, Wis. 4th, Marquette, Mich.; Deuster, Wis. 5th, Marquette, Mich.; Saint Vincent, Minn. 10th, Egg Harbor City, N. J. 11th, Eastport, Me.; Wytheville, Va. 12th, Wellsborough, Pa. 13th, Des Moines, Iowa. 14th, Saint Vincent, Minn.; Madison, Wis. 30th, New Haven, Conn.; Kent's Hill and Portland, Me.; Manchester, N. H.; Rose, N. Y.

THUNDER-STORMS.

Thunder-storms were most frequent in Kansas, where they were reported on every day during the month. In the Gulf states and over an area extending from the Missouri Valley eastward to the upper Ohio Valley and lower lake region they occurred on from twenty to twenty-three days. Along the middle Atlantic and New England coasts they occurred on from five to twelve days. The periods of greatest frequency were the 14-16th and 21-24th, when they were reported from twenty-seven to thirty-two states or territories. They were least numerous from 3d to 5th, being reported from eight to eleven states or territories on these dates.

Table showing the number of stations in the several states and territories reporting thunder-storms for each day during June, 1888.

State or Ter- ritory.	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.	19.	20.	21.	22.	23.	24.	25.	26.	27.	28.	29.	30.	31.	
Ala.										1	2	1	3	1	2	2		3	2	4	1	1	2	2	2	1	1	3	2	2		
Ariz.																																
Ark.	2	1				3		3	2	2		4		1	2	2	3	2	1	1	4	3	2	2	2	1	1					
Cal.	1	2																														
Colo.	3	2																														
Conn.						2																										
Duk.				5	10		2	8	5	2		5	7	6	6	5	4	1		4	5									1	6	
D. C.																																
Fla.	5	3	4	3							1		1	1	1	1	1															
Ga.	1	2								2	2	2	5	2	2	4	3	5	3	3	3	3	3	4	4	3	4	3	5			
Ill.	2	1				8	15	16	12			3	2	4	4	2	2	1	3	3	1	2	1	1	1	4	1	1	2	3	1	
Ind.						3		3	1	2				3		3	1	1	2			5	5	2				2				
Ind. T.			3					1	4	2	1								1	2	1	3	4	5	1		3					
Iowa.					6	19	2	3	6	5	2	4	11	14	16	1		12	10	16	22	11	1	2	2	5						
Kans.	5	2	3	2		1	1	2	11	3	1	3	8	3	7	2	1	5	3	10	8	7	5	3	7	4	7	1	1	1		
Ky.						1	2		1		2																					
La.		3							1	1	2	2	3	4	3	1	1	1	3	5		1	1	1	4	4		3	4			
Me.						6	2										3															
Md.																																
Mass.						10	8																									
Mich.	5				1	5			2	14	5		2	27	20	5	2	1	6	6	7	17	5	4	2							
Minn.				5	4			5	8	1		11	7				5	2		5	5	3							1	1		
Miss.	1	1																														
Mo.	1		1				2	2	4	1																						
Mont.	1	2	1			2	1																									
Nebr.	1	2		2	5	6	1	2			4	7	6	4	1		3	4	8	1								2	9	1	2	3
Nev.																																
N. H.						5	3																									
N. J.																																
N. Mex.																																
N. Y.		5				3		1		1	2																					
N. C.	3	3	1			3	2	2			2	1		1																		
Ohio.			1		2	5		1	11	12																						
Oregon.	4	1	1			1	1		4	1																						
Pa.		8				8	1		6	22	1																					
R. I.																																
S. C.	1		1				1	2			3	1	3	1	1	2																
Tenn.	3					6	3	6	4	11	1		3	7	12	10	5	3	13	8	3	7	8	4								
Tex.		3			2	3	7	2		5	2	2	3	1	5	5	1	5			1	1	8	9	9	4		3	2	1	1	
Utah.																																
Vt.						7																										
Va.			1	2							1	7	1				2	9	1													
Wash.						2	1		6	2	1																					
W. Va.																																
Wis.																																
Wyo.	2	1	2	1		2	2																									
Total No. states rep'g	18	18	10	8	11	29	21	21	22	25	20	18	21	32	31	29	22	28	24	22	28	27	33	32	18	26	23	19	18	23		

MISCELLANEOUS PHENOMENA.

DROUGHT.

Amherst C. H., Amherst Co., Va., 18th: no rain has fallen here during the past sixteen days and drought is beginning to affect the crops.

Catawissa, Columbia Co., Pa.: the drought which caused some injury to crops in this vicinity prior to the 21st was broken by the rain on that date.

Camden, Kershaw Co., S. C.: heavy rains fell on the 1st and 13th, but at the close of the month the weather was very dry and crops were suffering.

Vevay, Switzerland Co., Ind.: quite a severe drought prevailed here prior to the 27th, on which date there was an abundant rain.

Columbus, Ohio: the general rain which fell on the 28th was of great benefit in this section where the drought was becoming serious to all growing crops and pasturage. The hay is reported to be very light in this vicinity, due to the deficiency in rainfall.

Fort Apache, Ariz.: the light rain on the 29th was the first that had fallen here since May 4th. Vegetation has suffered seriously from the protracted drought.

Livingston, Sumter Co., Ala.: the weather was extremely dry during the first three weeks of the month, and much of the early corn was permanently injured.

HALOS.

The dates on which solar halos were observed over the greatest extent of territory during June were the 5th, 9th, 13th, and 19th; they were least numerous from the 1st to 3d, 10th, and 30th; they were observed on ten days in New York, Ohio,

and Washington Territory, California reporting the maximum, eleven days.

But few lunar halos were observed from the 1st to 13th and from the 24th to 30th, there being eight days during these periods on which none were observed; lunar halos were quite numerous from the 16th to 20th; they were seen on from six to eight days in Alabama, Missouri, Pennsylvania, Texas, and Virginia. None were reported from Connecticut, Delaware, District of Columbia, Indian Territory, Maine, Maryland, New Hampshire, New Mexico, Rhode Island, Utah, Vermont, and Wyoming.

The phases of the moon, Washington mean time, during June, as given in "The American Ephemeris and Nautical Almanac," are as follows: new moon, 8th, 23h. 25.8m.; first quarter, 16th, 13h. 41.5m.; 23d, 3h. 59.3m.; last quarter, 30th, 10h. 44.4m.; apogee, 5th, 16.2h.; perigee, 21st, 7.1h.

METEORS.

Prof. J. A. Mitchell, Mount Saint Mary's College, Emmitsburg, Md., furnishes the following:

At 10.45 p. m. Monday evening, June 10th, a meteor of extraordinary brilliancy passed over that portion of the heavens occupied by the constellations Aquila and Ophiuchus. It was first seen to emerge near the star Alpha Aquila, and then finally disappeared behind a cloud near the star Theta Ophiuchi. The size of the disk was about one-fourth the apparent diameter of full moon. At first it presented an elongated appearance, one end of which developed into a tail of about five apparent diameters of full moon. The color of the nucleus was at first of a pale blue, changing very suddenly to a reddish tinge. The duration of its appearance was about five seconds, and its brilliancy was such that the country appeared as if suddenly illuminated with the electric light. I may add that I have not observed a meteor of such superior beauty and brilliancy since the summer of 1885.